

(c) *Test method.* A flexible intermediate bulk container must be toppled onto any part of its top upon a rigid, non-resilient, smooth, flat, and horizontal surface.

(d) *Topple height.* For all flexible intermediate bulk containers, the topple height is specified as follows:

(1) Packing Group I: 1.8 m (5.9 feet).

(2) Packing Group II: 1.2 m (3.9 feet).

(3) Packing Group III: 0.8 m (2.6 feet).

(e) *Criteria for passing the test.* For all flexible intermediate bulk containers, there may be no loss of contents. A slight discharge (e.g., from closures or stitch holes) upon impact is not considered to be a failure, provided no further leakage occurs.

§ 178.817 Righting test.

(a) *General.* The righting test must be conducted for the qualification of all flexible intermediate bulk containers designed to be lifted from the top or side.

(b) *Special preparation for the righting test.* The flexible intermediate bulk container must be filled to not less than 95 percent of its capacity and to its maximum net mass, with the load being evenly distributed.

(c) *Test method.* The flexible intermediate bulk container, lying on its side, must be lifted at a speed of at least 0.1 m/second (0.33 ft/s) to an upright position, clear of the floor, by one lifting device, or by two lifting devices when four are provided.

(d) *Criterion for passing the test.* For all flexible intermediate bulk containers, there may be no damage to the intermediate bulk container or its lifting devices which renders the intermediate bulk container unsafe for transportation or handling.

§ 178.818 Tear test.

(a) *General.* The tear test must be conducted for the qualification of all flexible intermediate bulk container design types.

(b) *Special preparation for the tear test.* The flexible intermediate bulk container must be filled to not less than 95 percent of its capacity and to its maximum net mass, the load being evenly distributed.

(c) *Test method.* Once the intermediate bulk container is placed on the

ground, a 100-mm (4-inch) knife score, completely penetrating the wall of a wide face, is made at a 45° angle to the principal axis of the intermediate bulk container, halfway between the bottom surface and the top level of the contents. The intermediate bulk container must then be subjected to a uniformly distributed superimposed load equivalent to twice the maximum net mass. The load must be applied for at least five minutes. An intermediate bulk container which is designed to be lifted from the top or the side must, after removal of the superimposed load, be lifted clear of the floor and maintained in that position for a period of five minutes.

(d) *Criterion for passing the test.* The intermediate bulk container passes the tear test if the cut does not propagate more than 25 percent of its original length.

§ 178.819 Vibration test.

(a) *General.* The vibration test must be conducted for the qualification of all rigid intermediate bulk container design types. Flexible intermediate bulk container design types must be capable of withstanding the vibration test.

(b) *Test method.* (1) A sample intermediate bulk container, selected at random, must be filled and closed as for shipment.

(2) The sample intermediate bulk container must be placed on a vibrating platform that has a vertical double-amplitude (peak-to-peak displacement) of one inch. The intermediate bulk container must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

(3) The test must be performed for one hour at a frequency that causes the package to be raised from the vibrating platform to such a degree that a piece of material of approximately 1.6-mm (0.063-inch) thickness (such as steel strapping or paperboard) can be passed between the bottom of the intermediate bulk container and the platform. Other methods at least equally effective may be used (see § 178.801(i)).

(c) *Criteria for passing the test.* An intermediate bulk container passes the

vibration test if there is no rupture or leakage.

[Amdt. 178–103, 59 FR 38074, July 26, 1994, as amended by Amdt. 178–108, 60 FR 40038, Aug. 4, 1995; Amdt. 178–110, 60 FR 49111, Sept. 21, 1995]

APPENDIX A TO PART 178—SPECIFICATIONS FOR STEEL

TABLE 1

[Open-hearth, basic oxygen, or electric steel of uniform quality. The following chemical composition limits are based on ladle analysis:]

Designation	Chemical composition, percent-ladle analysis		
	Grade 1 ¹	Grade 2 ^{1 2}	Grade 3 ^{2 4 5}
Carbon	0.10/0.20	0.24 maximum	0.22 maximum.
Manganese	1.10/1.60	0.50/1.00	1.25 maximum.
Phosphorus, maximum	0.04	0.04	0.045. ⁶
Sulfur, maximum	0.05	0.05	0.05.
Silicon	0.15/0.30	0.30 maximum	
Copper, maximum	0.40	0.01/0.04	
Columbium			
Heat treatment authorized	(³)	(³)	(³).
Maximum stress (p.s.i.)	35,000	35,000	35,000.

¹ Addition of other elements to obtain alloying effect is not authorized.

² Ferritic grain size 6 or finer according to ASTM E112–63.

³ Any suitable heat treatment in excess of 1,100 °F., except that liquid quenching is not permitted.

⁴ Other alloying elements may be added and shall be reported.

⁵ For compositions with a maximum carbon content of 0.15 percent of ladle analysis, the maximum limit for manganese on ladle analysis may be 1.40 percent.

⁶ Rephosphorized Grade 3 steels containing no more than 0.15 percent phosphorus are permitted if carbon content does not exceed 0.15 percent and manganese does not exceed 1 percent.

CHECK ANALYSIS TOLERANCES

[A heat of steel made under any of the above grades, the ladle analysis of which is slightly out of the specified range is acceptable if the check analysis is within the following variations:]

Element	Limit or maximum specified (percent)	Tolerance (percent) over the maximum limit or under the minimum limit	
		Under minimum limit	Over maximum limit
Carbon	To 0.15 inclusive	0.02	0.03
	Over 0.15 to 0.40 inclusive	0.03	0.04
Manganese	To 0.60 inclusive	0.03	0.03
	Over 0.60 to 1.15 inclusive	0.04	0.04
	Over 1.15 to 2.50 inclusive	0.05	0.05
Phosphorus ⁷	All ranges		0.01
Sulfur	All ranges		0.01
Silicon	To 0.30 inclusive	0.02	0.03
	Over 0.30 to 1.00 inclusive	0.05	0.05
Copper	To 1.00 inclusive	0.03	0.03
	Over 1.00 to 2.00 inclusive	0.05	0.05
Nickel	To 1.00 inclusive	0.03	0.03
	Over 1.00 to 2.00 inclusive	0.05	0.05
Chromium	To 0.90 inclusive	0.03	0.03
	Over 0.90 to 2.10 inclusive	0.05	0.05
Molybdenum	To 0.20 inclusive	0.01	0.01
	Over 0.20 to 0.40 inclusive	0.02	0.02
Zirconium	All ranges	0.01	0.05
Columbium	To 0.04 inclusive	0.005	0.01
Aluminum	Over 0.10 to 0.20 inclusive	0.04	0.04
	Over 0.20 to 0.30 inclusive	0.05	0.05

⁷ Rephosphorized steels not subject to check analysis for phosphorus.

[Amdt. 178–3, 34 FR 12283, July 25, 1969; 34 FR 12593, Aug. 1, 1969, as amended by Amdt. 178–64, 45 FR 81573, Dec. 11, 1980; Amdt. 178–97, 55 FR 52728, Dec. 21, 1990]